

Application Serial No.: 09/895,887
Examiner: Mark Ruthkosky
Attorney Docket No.: SE-30

REMARKS/ARGUMENTS

In the April 13, 2004 Office Action ("the Action"), the Examiner approved the drawings filed on December 9, 2002 and indicated that claims 21, 22, and 23 would be allowable if written in independent form. Applicant acknowledges these findings with thanks. As discussed at greater length below, Applicant respectfully traverses the rejection of claim 20, a claim from which claims 21, 22, and 23 each depend either directly or indirectly. However, to expedite prosecution and without detracting from the arguments set forth herein, Applicant has rewritten claims 21, 22, and 23 in independent form, as suggested by the Examiner. Applicant therefore believes currently amended claims 21, 22, and 23 to be in condition for allowance in accordance with the Action.

The Examiner rejected claims 1, 2, 18, 19, and 28 of the application under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,015,633 to Carlstrom, Jr. et al. ("Carlstrom, Jr."). Applicant has canceled claims 1, 2, 18, and 19, but has amended claim 28 to reflect that the wicking means of claim 28 could be comprised of a material selected from the group consisting of metals and ceramics. This newly added limitation saves claim 28 from anticipation by Carlstrom, Jr., as Carlstrom, Jr. specifically teaches the advantages of a porous fabric wick in a fuel cell gas humidification system, thereby teaching away from a fuel cell gas humidification system that includes a porous metallic or ceramic wick, the structure claimed in claim 28 as amended herein.

In the Action, the Examiner also set forth the following rejections on the basis of the claims being obvious under 35 U.S.C. § 103(a):

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claims 3, 4, 11, and 20—Carlstrom, Jr. in view of U.S. Patent No. 5,458,837 to Roberts et al. (“Roberts”);

claims 3, 5, 6, 7, 12, 13, 14, 20, 24—Carlstrom, Jr. in view of UK Patent Application No. GB 2,162,680 to Vic (“Vic”); and

claims 3-17, 20, and 24-27—Carlstrom, Jr. in view of U.S. Patent No. 4,765,396 to Seidenberg (“Seidenberg”).

Applicant respectfully submits that none of the above rejections establish a *prima facie* case of obviousness because the Examiner has not shown that one of ordinary skill in the art would be motivated to make the above combinations of prior art references. Instead, the Examiner has impermissibly used “ ‘ that which the inventor taught against its teacher.’ ” In re Sang-Su Lee, 277 F.3d 1338, 1344 (Fed. Cir. 2002) (quoting W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553 (Fed. Cir. 1983)).

In fact, one of ordinary skill in the art would actually be disinclined rather than motivated to combine the cited prior art references because (1) as discussed above in the anticipation context, Carlstrom, Jr., the primary reference in each of the above obviousness rejections, teaches the advantages of fabric wicks in fuel cell humidification and teaches away from metallic or ceramic wicks in such applications, see In re Haruna, 249 F.3d 1327, 1335-36 (Fed. Cir. 2001) (reversing an obviousness rejection because of teaching away and holding that “A reference may be said to teach away when a person of ordinary skill, upon reading the reference, ... would be led in a direction divergent from the path that was taken by the applicant.”); and (2) the wicks taught in the secondary references (Roberts, Vic, and Seidenberg) are used for nonanalogous purposes and in nonanalogous arts relative to that of Carlstrom, Jr. and the claimed invention, see

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In re Oetiker, 977 F.2d 1443, 1447 (Fed. Cir. 1992) (reversing an obviousness rejection because of the use of nonanalogous art and holding that "In order to rely on a reference as a basis for rejection of the applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.").

Carlstrom, Jr. states as follows:

In this exemplary embodiment and the embodiments described below, the non-porous portion may comprise a metallic material, e.g. stainless steel or a resin-impregnated graphite material, and the porous portion may be a separate suitable porous material or wicking material, or other material which transmits water. For example, porous or wicking material may comprise a cotton cheesecloth material

....
In [the fifth] embodiment, [illustrated in FIGS. 13A and 13B,] porous portion 750 swells or increases in size when it is saturated or otherwise contains water, and shrinks or decreases in size as it dries [sic]. Porous portion 750 may be fabricated from or comprise wool

As shown in FIG. 13B, porous portion 750 swells or expands, so that surface 754 spans across the openings of passageways 792. As shown in FIG. 13A, as porous portion dries it pulls back from the openings of passageways 792 to form a clearance or gap 756 which readily allows water to flow and travel along the length of porous portion 750. As the porous portion 750 becomes saturated, porous portion 750 expands and covers the opening of passageways 792. Such an expandable porous portion provides a self-regulating mechanism for rapidly providing water along the entire length of porous portion 750.

Carlstrom, Jr. at col. 8, lns. 61-67; col. 13, lns. 6-9, 12-22. No other specific discussion of the porous wicking material of Carlstrom, Jr. is provided therein. Thus, Carlstrom, Jr. differentiates between nonporous metallic or graphite material and "separate" porous fabric wicking material, and then goes on to explain an advantage of porous fabric wicking material—self-regulation of water flow by expansion and contraction—that neither metallic nor ceramic porous wicking materials provide, as such materials are too rigid to expand or contract merely by introducing or removing water. Therefore, Carlstrom, Jr. teaches away from using metallic or ceramic wicking

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materials in fuel cell humidification and cannot serve as a primary reference in a combination of references supporting a conclusion under 35 U.S.C. § 103 that one of ordinary skill in the art would have considered the use of porous metallic or ceramic wicks in fuel cell humidification to be obvious at the time the invention claimed in the present application was made. The Examiner's obviousness rejections, all of which use Carlstrom, Jr. as the primary reference, are therefore improper and should be withdrawn.

Even if Carlstrom, Jr. did not teach away from using porous metallic or ceramic wicks in fuel cell humidification, the Examiner's obviousness rejections would still be improper in light of the nonanalogous nature of the art that the Examiner chose to combine with Carlstrom, Jr. to arrive at those rejections. First, Roberts et al. discloses a method of manufacturing a ceramic wick for use as a burner element (i.e., to wick liquid fuel; FIGS. 5-8), a diffuser in a burner (i.e., to diffuse gas in a burner; FIG. 9), an element for containing neon plasma to be illuminated by an electrode (FIG. 10), an element to wick water and/or nutrients to a plant in a planter and to anchor such a plant (FIG. 11), and a planting pellet (FIG. 13), among other uses (Roberts et al. at col. 14, ln. 52 to col. 15, ln. 46). None of these uses have any relation to fuel cells, much less any relation to fuel cell humidification. Therefore, one of ordinary skill in the art would not be motivated to combine Roberts et al. with Carlstrom, Jr. and the Examiner's rejection to the contrary should be withdrawn.

Vic, another reference combined with Carlstrom, Jr. by the Examiner, is also nonanalogous to fuel cell humidification. Specifically, Vic discloses the use of a porous metal wick in an electrochemical generator to distribute sodium and collect current within the generator (Vic at lns. 94-100). No mention of fuel cells, humidification, or fuel cell

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humidification is made in Vic. Therefore, one of ordinary skill in the art would not be motivated to combine Vic with Carlstrom, Jr. and the Examiner's rejection to the contrary should be withdrawn.

Finally, Seidenberg, the final reference combined with Carlstrom, Jr. by the Examiner, is also nonanalogous to fuel cell humidification. Specifically, Seidenberg discloses, among other things, metallic and ceramic wicks for use in prior art heat pipe systems (Seidenberg at col. 2, lns. 13-45) and the use of polyethylene wicks in such systems (Id. at col. 5, lns. 28-55). In all these systems, the wicks are used to transport refrigerants such as freons, water, water-salts, alcohols, and citrus oils (Id. at col. 6, lns. 6-15) to accomplish heat transfer in low energy environments such as spacecraft (Id. at col. 1, lns. 17-23). In Seidenberg, the use of the wicks does not relate to fuel cells or to humidification, much less to fuel cell humidification. Therefore, one of ordinary skill in the art would not be motivated to combine Seidenberg with Carlstrom, Jr. and the Examiner's rejection to the contrary should be withdrawn.

In light of the above remarks and arguments, Applicant respectfully traverses the Examiner's rejections of claims 3-17, 20, and 24-28, as all such claims have herein been amended to cover fuel cell humidification systems and methods that use a metallic and/or ceramic porous wick, thereby defining the invention over the prior art. No new matter is introduced by the amendments.

In view of the above amendment and remarks, it is believed that this application is in condition for allowance. An early allowance is solicited.

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Respectfully submitted,

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